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**Modelling the comparative costs of Namaste Care: Results  
from the Namaste Care Intervention UK study**

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**Modelling the comparative costs of Namaste Care: Results from the Namaste Care Intervention UK study**

**Abstract**

**Purpose:** To populate a theoretical cost model with real-world data, calculating staffing, resource and consumable costs of delivering NCI-UK sessions versus ‘usual care’ for care home residents with advanced dementia.

**Design:** Data from five care homes delivering NCI-UK sessions populated the cost model to generate session- and resident-level costs. Comparator usual care costs were calculated based on expert opinion and observational data. Outcome data for residents assessed the impact of NCI-UK sessions and aligned with the resident-level costs of NCI-UK.

**Findings:** NCI-UK had a positive impact on residents’ physical, social and emotional well-being. An average NCI-UK group session cost £220.53, 22% more than usual care, and ran for 1.5-2 hours per day for 4-9 residents. No additional staff were employed to deliver NCI-UK, but staff-resident ratios were higher during Namaste Care. Usual care costs were calculated for the same time period when no group activity was organised. The average cost per resident, per NCI-UK session was £38.01, £7.24 more than usual care. In reality, costs were offset by consumables and resources being available from stock within a home.

**Originality:** Activity costs are rarely calculated as the focus tends to be on impact and outcomes. This article shows that, although not cost neutral as previously thought, NCI-UK is a low-cost way of improving the lives of people living with advanced dementia in care homes.

**Introduction**

Namaste Care is a non-pharmacological, multi-component intervention designed to improve care for people living with advanced dementia in care homes. Using daily sessions delivered by care staff, Namaste Care brings together small groups of residents with significant cognitive disabilities and provides sensory stimulation, emotional connection and physical

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3 comfort. Developed in the USA (Simard, 2013), it has been shown to reduce distress  
4 behaviours, depressive symptoms, pain, use of antipsychotic medications and inappropriate  
5 hospitalisation in people living with advanced dementia in care homes (Stacpoole and  
6 Thompson, 2014). The Namaste Care Intervention UK (NCI-UK) is a refined and  
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8 standardised version of the original intervention. It incorporates evidence from both research  
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10 and practice and has been previously described by Bray *et al.* (2019a) and Latham *et al.*  
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20 As part of a three-year research project exploring the barriers and facilitators to the  
21 implementation of NCI-UK within care homes, a cost model was previously developed to  
22 investigate the full cost of delivering a NCI-UK session (Bray *et al.*, 2019b). To reflect the full  
23 economic cost of NCI-UK, all resources expended during a session are included in the NCI-  
24 UK cost model. This includes staff time and consumable items such as furniture, pillows and  
25 music. The NCI-UK cost model makes it possible to estimate costs in terms of staff, capital  
26 and consumable requirements, and provides a cost per session or per resident, taking into  
27 account the components delivered within an individual session, such as food treats, music,  
28 and hand massage.  
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41 Namaste Care is said to be cost neutral as it does not require expensive equipment or  
42 additional staff and space (Stacpoole and Thompsell, 2014). However, little is known about  
43 the changes needed within a care home to implement Namaste Care, such as resource use,  
44 planning time and session costs. In addition to providing important information about the  
45 costs of individual sessions, the NCI-UK cost model enables the wider project to examine  
46 the costs and benefits of delivering NCI-UK. The flexibility of the cost model makes it  
47 possible to generate costs for comparable 'usual care', which represents the care residents  
48 with advanced dementia would receive on a day-to-day basis if they were not participating in  
49 a NCI-UK session. By comparing NCI-UK and usual care costs, the relative or 'incremental'  
50 cost of delivering NCI-UK enables the affordability of NCI-UK to be assessed. When  
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combined with outcome measures capturing the impact of NCI-UK sessions, cost information can be used to determine the potential cost-benefit of NCI-UK.

NCI-UK was implemented in five care homes over a 3-6 month period. For each NCI-UK session delivered, care home staff used the ‘Namaste Short Questionnaire’ (NSQ) to record standard information relating to duration, attendees, and components delivered. The NSQ was developed specifically for the research, and also captures staff-rated session data for each resident who consented to be part of the research. Staff used a five-point scale to rate the physical wellbeing, emotional wellbeing and awareness/alertness of residents before and after each NCI-UK session. An increase on the scale reflects a positive impact on the residents. The process for obtaining consent from participants was approved by the Health Research Authority (South Central-Oxford C Research Ethics Committee; Reference 17/SC/0430).

This article shows how the theoretical NCI-UK cost model can be populated with real-world NSQ data to calculate the relative costs of delivering NCI-UK sessions compared to ‘usual care’ for care home residents with advanced dementia. It also provides information regarding resource use and planning time required to implement NCI-UK. For the purpose of the research, NCI-UK is considered to be an intervention that does not require a resident or their family to spend anything in order to participate. Therefore, the cost of delivering NCI-UK focuses on the care home perspective, not the cost to residents or families.

**Methods**

Descriptive analysis of the NCI-UK sessions was carried out on the full data set, with cases of missing data being resolved by substituting the most frequently occurring values from similar sessions. The only exception related to the number of relatives and staff present during a session. If relatives were known to be present but the number was not specified, it was assumed that there was one relative and all other people were staff.

The complete data set was used to populate the cost model and generate session costs and costs per resident, per session. Comparator costs for usual care were generated using the approach defined in Bray *et al.* (2019b), which combined expert opinion and researcher observations from the wider research project.

Change in NSQ outcomes for each resident in each NCI-UK session were calculated to enable the cost per resident to be aligned with the impact. In-depth observations using PIECE-dem (Brooker *et al.*, 2013) were conducted on a subset of residents during NCI-UK sessions and during periods of usual care. This observational data was used as a basis from which to extrapolate likely NSQ outcomes for residents during usual care. As a form of sensitivity analysis, three scenarios were considered for usual care:

1. Residents improved as a result of usual care
2. Residents remained at the same level as a result of usual care
3. Residents declined as a result of usual care

The incremental cost-effectiveness ratio (ICER) was applied to the overall NSQ scores for each of the three scenarios to find the average incremental cost associated with a change of one point on the NSQ scale. The ICER formula used was:

$$\frac{\text{Cost of NCI-UK} - \text{Cost of usual care}}{\text{Change in NCI-UK NSQ score} - \text{Change in usual care NSQ score}}$$

## Results

### *Overview of NCI-UK sessions delivered*

Implementation of NCI-UK varied between the care homes (Table I). On average, Azalea Court delivered the shortest sessions, with Gardenia Lodge running the longest ones. Clover House had the biggest resident group sizes with Gardenia Lodge having the smallest. Clover House only had one member of staff running a session regardless of group size, whereas

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sessions at Gardenia Lodge were more likely to be run by a pair of staff. Time spent planning NCI-UK sessions was ongoing, resulting in Azalea Court and Elm Gardens having the larger totals as they implemented NCI-UK sessions for longer.

---Insert Table I here---

The total cost per care home of delivering all of the NCI-UK sessions is provided in Table II, together with comparative costs for usual care. The context for these costs is provided by the number of NCI-UK sessions delivered in each care home and the total number of residents taking part in the sessions.

---Insert Table II here---

*Session level costs of delivering NCI-UK*

An overview of NCI-UK session costs is provided in Figure 1, showing the number of sessions with a cost that falls within each £20 bracket for each care home and overall. Although the overall range of costs is quite broad at £80-£480, the more expensive sessions are rare occurrences with most sessions costing between £140 and £260. For Azalea Court, Elm Gardens and Foxglove Place, most sessions tend to be in this £140-£260 range, while for Clover House and Gardenia Lodge they are more expensive at around £220-£360. This is in part due to Clover House and Gardenia Lodge running fewer sessions and the cost model spreading the cost over the number of sessions delivered.

---Figure 1 to be inserted here---

On average, NCI-UK sessions were more expensive than usual care sessions by around £38 (22%) (Table III). When breaking down the costs by resource type it was seen that

capital costs were the same for NCI-UK and usual care; consumable costs were lower for NCI-UK by nearly £10; and staff costs were higher for NCI-UK by about £48.

---Insert Table III here---

### *Resident level costs of delivering NCI-UK*

Overall, 1649 individual 'cases' were included in the analysis for the 48 residents who participated in the research, with a 'case' representing an attendance at a NCI-UK session. Table IV shows that delivering NCI-UK cost £38.01 per resident, per session on average, and the total NSQ score improved by an average of 1.31 points. This equates to an improvement of 18.6% during a NCI-UK session. Delivering NCI-UK instead of usual care costs an extra £7.24 per resident, per session. Clover House and Foxglove Place delivered comparatively expensive NCI-UK sessions, while Gardenia Lodge ran NCI-UK sessions that were only an average of £0.45 per resident more expensive than usual care.

--Insert Table IV here---

The total incremental cost of delivering NCI-UK instead of usual care was £11,943.41. The ICER formula was applied for the three usual care scenarios:

- In a scenario where resident outcomes improved during usual care sessions the ICER value was -£4.46. I.e. spending an extra £4.46 per resident to provide NCI-UK would not offer any comparative benefit in terms of improving NSQ scores.
- In a scenario where usual care sessions had no impact on resident outcomes the ICER value was £5.53. I.e. it would be possible to improve NSQ scores by 1 point by spending an extra £5.53 per resident, per session implementing NCI-UK.

- In a scenario where resident outcomes declined during usual care sessions the ICER value was £1.22. I.e. it would be possible to improve NSQ scores by 1 point by spending an extra £1.22 per resident, per session implementing NCI-UK.

In all scenarios NCI-UK costs more than usual care, but in the second and third scenarios this higher cost is associated with an improvement in outcomes as a result of NCI-UK.

**Limitations**

As this research did not involve a control group, the usual care session information is based on expert opinion and observations of participating residents outside of NCI-UK sessions. This may have introduced bias. In addition, as the same residents were observed within NCI-UK and usual care the authors cannot rule out effects of one type of care transferring to the other. However, using the same information about the number of sessions run, type of room used, session duration and number of residents for the individual care homes and sessions, should ensure that the usual care costs are as comparable as possible.

As discussed previously, remedial procedures were applied to missing data, highlighting a significant limitation of this costing study. NSQ data relied on care home staff completing forms in real time to be processed by the research team later on. Issues with mis-recording or inconsistent recording could not be corrected and may have been exacerbated during remedial processes. For example, one care home reported that the NSQs were not completed for several weeks as the manager was not present to remind staff. This will have resulted in a significantly lower number of NCI-UK sessions than actually occurred, and subsequently a much higher per-session cost than in reality.

The primary limitation, previously acknowledged, is the approach taken regarding staff numbers. The level of detail collected on the NSQ forms meant that assumptions were required regarding the additional people present during a NCI-UK session, so a consistent



approach was applied to all NCI-UK sessions. By assuming all extra people were staff, having a maximum of one relative in a session and not accounting for volunteers, NCI-UK costs relating to staff are likely to be higher than the actual costs in practice. This will have been a factor in the main difference between NCI-UK and usual care being related to staff costs. This qualification is of particular note given that qualitative data collection for the wider research project indicated that volunteers were often used within NCI-UK sessions. These results should therefore be taken as a strong indication of the comparative costs of NCI-UK and usual care, rather than an exact representation. However, it is unlikely that NCI-UK sessions would be cheaper than usual care, as the number of additional people would still be the same and have an impact on cost, even if staff wages were not a factor.

## Discussion

The theoretical cost model for NCI-UK which was developed during an earlier phase of the research project has subsequently been combined with real-world data to generate the relative cost of delivering NCI-UK sessions based upon national price weights. It found that session delivery varied between care homes, but in total 521 NCI-UK sessions were run with 3349 resident attendances at a total cost of nearly £115,000. If NCI-UK had not been delivered, the comparable cost of usual care was estimated at just over £95,000.

Unsurprisingly, care homes delivering more NCI-UK sessions spent more money in total, but also reached a greater number of residents. When compared to the total usual care cost of the same sessions, NCI-UK was more expensive in each care home.

While NCI-UK session costs varied, most were in the £140-£260 range with an average cost of £220.53. For usual care the average session cost was estimated at £182.42, making NCI-UK 22% more expensive than usual care.

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To illustrate the difference between NCI-UK and usual care, two extreme examples of NCI-UK sessions are presented; one which was very low cost in comparison to usual care, and one which was very high cost.

*Low cost example*

A 1-hour NCI-UK session was run by two members of staff for a group of 18 residents. During that hour music was playing and residents were provided with soft blankets. Residents were engaged through touch, having a variety of tactile objects and soft toys. The session was relatively quiet with no expensive components being delivered. Consequently, the NCI-UK session had low consumable costs making it 23% cheaper than usual care.

*High cost example*

A 1.5-hour NCI-UK session was run for five residents, but ten staff members and one relative were also present. Music was playing and residents were provided with soft blankets. In addition to tactile objects and soft toys, residents were engaged through hand massages, bringing aspects of nature into the session and playing specific sounds or songs that would be meaningful to individual residents. Drinks were also provided. Although there were many components taking place, none were expensive. However, there was a high number of staff for a relatively small group of residents. It is therefore unsurprising that the NCI-UK session was 102% more expensive than usual care, with the main difference being the high staff costs. For NCI-UK the staff costs were over four times those of usual care.

This latter example was an extreme outlier in our data and, when compared with the reality of NCI-UK as represented within the qualitative data from the research project, it would seem most likely this arose either due to inappropriate data recording by care staff or because of our assumptive responses to missing data. It is highly unlikely in practice that any care home would have double as many staff in the room as residents, and much more

likely that other residents, relatives or visitors were included in the 'other people attending' section of the form. The missing data procedures would have exacerbated the error.

Most of the 'extra' cost of NCI-UK is a result of the number of staff involved in each session, with staff costs being twice as expensive for NCI-UK than for usual care on average. For context, NCI-UK staff costs represent around 30-50% of the session cost, whereas for a usual care session it is closer to 15-30%. While this is likely to be due in part to the assumptions made around additional people, it is also likely that because NCI-UK is a new intervention, more staff were involved than anticipated. Additionally, some sessions involved larger groups of residents than expected, which are more likely to require multiple members of staff. The intention was for a session to be run by one member of staff, but this was the case in 77% of sessions, and only 65% of sessions had one member of staff present in total. This is not surprising, as staff may have wanted to work together or observe sessions to learn how to deliver the new intervention, and support each other until they felt more comfortable and able to run a session on their own. This is an important finding because such practical decision-making is likely to arise with the implementation of any new intervention and, as such, the associated costs should be considered as integral to the intervention itself.

As would also be expected for a new intervention, planning time was required prior to the first sessions being delivered. Planning time was more likely to be loaded towards the start of implementation, but as NCI-UK became more established within the care homes and more comfortable for staff to deliver, planning reduced. However, an ongoing low level of planning time was required throughout the delivery period. If a care home chooses to implement NCI-UK it should therefore expect an initial start-up period with higher costs relating to session planning and staff learning, before delivery of the intervention becomes embedded within the care home's way of working.

In addition, it is important to note that the NCI-UK costing model and the results stemming from it are based on costing all consumables as 'new' at the start of implementation. In reality, this was not the case for the care homes who obtained consumables via donation or by utilising existing resources in the home. This is discussed in detail in Bray *et al.* (2019b) but is worth restating as it would suggest that the practical cost of NCI-UK for care homes will be lower than reported here. Nonetheless, the findings highlight an important consideration for any new care home intervention and help to explicate costs that can be 'hidden' within practical decision-making and intervention descriptions.

There are different sources of uncertainty within these findings, including the range of NCI-UK session costs, the range of NSQ outcomes and the fact that the actual impact of usual care is unknown. However, the three scenarios considered within this article as a form of sensitivity analysis using the ICER enable us to interpret our findings. They also provide an indication of the additional costs required to deliver NCI-UK in order to see different changes. In a 'best case' scenario for NCI-UK where usual care has a detrimental impact on residents, it would be possible to improve NSQ scores by 1 point by spending an extra £1.22 per resident, per session implementing NCI-UK. Conversely, if usual care already has a positive effect on all residents, spending an extra £4.46 per resident to provide NCI-UK would not offer any comparative benefit in terms of improving NSQ scores. However, experience within the wider research project, and prevailing understandings of care for people living with advanced dementia in care homes, would suggest that usual care is by no means guaranteed to have a positive effect on residents, with the first scenario more often reflected in practice. Therefore NCI-UK would appear to be a relatively low cost way of improving the lives of people living with advanced dementia in care homes.

Overall, NCI-UK was found to have a positive impact on almost every resident involved in the evaluation, but this is achieved at a cost. At a resident level, the average cost per resident, per session was £38.01, which can be used as a benchmark cost of NCI-UK

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3 delivery. This equates to an extra £7.24 per resident, per session compared to usual care.  
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5 However, as acknowledged, the limitations of the real-world data used within the cost model  
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7 suggest that this value is higher than the actual cost of NCI-UK in practice. While NCI-UK  
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9 costs more than usual care, it was also found to have a positive outcome for most residents,  
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11 with an average improvement of 1.31 points for the total NSQ score. The decision to  
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13 implement NCI-UK within a care home may therefore depend not just on financial factors,  
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15 but also on a care home's usual care provision.  
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**Conflict of interest declaration:** None

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**Table I: Overview of NCI-UK sessions delivered**

Care home pseudonym	Delivery period	Total planning time (minutes)*	Number of NCI-UK sessions	Type of room	NCI-UK session duration (minutes) mean (range)	No. residents per session mean (range)	No. staff running a session mean (range)
Azalea Court	6 months	2940	121	Space within care home	67 (45 to 120)	8.01 (2 to 18)	1.27 (1 to 4)
Clover House	3 months	1800	60	Space within care home	89 (60 to 90)	9.15 (2 to 18)	1 (1)
Elm Gardens	6 months	5160	144	Dedicated room	92 (30 to 120)	6.44 (2 to 12)	1.53 (1 to 3)
Foxglove Place	4.5 months	1440	165	Dedicated room	109 (45 to 120)	4.73 (1 to 12)	1 (1)
Gardenia Lodge	4.5 months	1020	31	Dedicated room	118 (90 to 120)	3.97 (2 to 6)	1.48 (1 to 2)
<b>Overall</b>	<b>Up to 6 months</b>	<b>12360</b>	<b>521</b>	<b>n/a</b>	<b>93 (30 to 120)</b>	<b>6 (1 to 18)</b>	<b>1.24 (1 to 4)</b>

\* including planning during the month prior to delivery

Table II: Total NCI-UK and usual care session costs

Care home	Number of NCI-UK sessions	Total no. of attendances by residents	Total NCI-UK cost	Total usual care cost	Percentage additional cost of NCI-UK compared to UC
Azalea Court	121 (over 6 months)	969	£23,061.06	£18,736.67	23% higher for NCI
Clover House	60 (over 3 months)	549	£17,469.62	£15,396.37	13% higher for NCI
Elm Gardens	144 (over 6 months)	927	£31,786.54	£25,248.11	26% higher for NCI
Foxglove Place	165 (over 4.5 months)	781	£33,496.59	£26,762.81	25% higher for NCI
Gardenia Lodge	31 (over 4.5 months)	123	£9,079.92	£8,897.25	2% higher for NCI



Table III: Average NCI-UK and usual care session costs (in GBP £) by type of resource

Care Home	NCI-UK session cost (£) mean(range)				Usual Care session cost (£) mean(range)				Absolute difference between NCI-UK and usual care (£) mean(range)			
	Staff	Capital	Consumables	Total	Staff	Capital	Consumables	Total	Staff	Capital	Consumables	Total
Azalea Court	95.59 (33.72 to 165.45)	23.20 (19.25 to 33.00)	71.80 (16.22 to 186.37)	190.59 (83.34 to 365.00)	41.97 (31.21 to 51.89)	23.20 (19.25 to 33.00)	89.68 (26.64 to 194.01)	154.85 (82.49 to 257.32)	53.62 (2.51 to 118.85)	0	-17.88 (-137.13 to 55.12)	35.74 (-95.23 to 148.80)
Clover House	108.87 (50.41 to 253.75)	27.36 (22.00 to 27.50)	154.93 (60.62 to 338.63)	291.16 (147.86 to 460.94)	45.60 (39.14 to 46.60)	27.36 (22.00 to 27.50)	183.65 (48.92 to 349.54)	256.61 (115.56 to 423.64)	63.27 (11.27 to 207.15)	0	-28.71 (-135.73 to 44.66)	34.55 (-87.52 to 229.71)
Elm Gardens	100.71 (45.12 to 159.26)	63.57 (37.50 to 75.00)	56.47 (15.38 to 123.58)	220.74 (110.50 to 310.38)	46.02 (33.85 to 51.89)	63.57 (37.50 to 75.00)	65.75 (24.97 to 116.49)	175.33 (108.82 to 243.38)	54.69 (11.27 to 110.02)	0	-9.28 (-46.50 to 35.85)	45.41 (-2.85 to 121.79)
Foxglove Place	81.63 (33.16 to 138.66)	70.25 (43.75 to 75.00)	51.12 (8.21 to 124.21)	203.01 (91.69 to 299.30)	45.81 (31.21 to 51.89)	70.25 (43.75 to 75.00)	45.14 (14.40 to 105.16)	162.20 (89.36 to 232.04)	35.82 (1.95 to 89.42)	0	5.98 (-33.95 to 43.59)	40.80 (-17.07 to 112.23)
Gardenia Lodge	78.11 (50.41 to 123.64)	74.19 (62.50 to 75.00)	140.59 (58.41 to 244.30)	292.90 (189.11 to 442.95)	46.01 (39.14 to 51.89)	74.19 (62.50 to 75.00)	166.80 (98.78 to 235.75)	287.01 (209.31 to 362.63)	32.10 (11.27 to 71.75)	0	-26.21 (-108.27 to 41.26)	5.89 (-65.53 to 113.02)
Overall	93.07 (33.16 to 253.75)	52.77 (19.25 to 75.00)	74.68 (8.21 to 338.63)	220.53 (83.34 to 460.94)	44.96 (31.21 to 51.89)	52.77 (19.25 to 75.00)	84.37 (14.40 to 349.54)	182.42 (82.49 to 423.64)	48.11 (1.95 to 207.15)	0	-9.69 (-137.13 to 55.12)	38.10 (-95.23 to 229.71)

Table IV: Overview of NSQ cases, NCI-UK and comparable usual care costs (in GBP £), and NSQ changes

Care home	Number of participating residents	Number of NSQ resident cases	Costs per resident (£)		Incremental NCI-UK cost per resident (£)	Actual NSQ change for residents in NCI-UK sessions			
			Mean (range)			Mean (range)			
			NCI-UK	Usual care	Mean (range)	Physical wellbeing	Emotional wellbeing	Alertness/ awareness	Total
Azalea Court	7	348	24.75 (9.01 to 41.67)	19.89 (14.30 to 41.25)	4.86 (-5.29 to 11.45)	0.77 (-2 to 3)	1.21 (-1 to 4)	1.03 (-1 to 3)	3.01 (-1 to 9)
Clover House	7	165	38.73 (18.67 to 90.4)	29.99 (23.54 to 45.05)	8.73 (-5.58 to 45.35)	-0.12 (-4 to 4)	1.16 (-4 to 4)	0 (-4 to 4)	1.43 (-12 to 11)
Elm Gardens	13	439	35.08 (23.37 to 74.12)	27.52 (19.09 to 63.31)	7.56 (-3.33 to 24.36)	0.05 (-2 to 3)	0.35 (-2 to 3)	0 (-3 to 3)	0.54 (-7 to 7)
Foxglove Place	14	620	43.07 (19.02 to 128.25)	34.27 (19.34 to 116.04)	8.80 (-6.11 to 17.48)	0.23 (-2 to 2)	0.31 (-3 to 2)	0.29 (-3 to 4)	0.83 (-8 to 6)
Gardenia Lodge	7	77	72.48 (53.05 to 113.70)	72.03 (60.44 to 109.10)	0.45 (-16.38 to 22.60)	0.43 (0 to 4)	0.64 (-2 to 3)	0.51 (-1 to 3)	1.57 (-1 to 9)
Overall	48	1649	38.01 (9.01 to 128.25)	30.77 (14.30 to 116.04)	7.24 (-16.38 to 45.35)	0.27 (-4 to 4)	0.61 (-4 to 4)	0.43 (-4 to 4)	1.31 (-12 to 11)

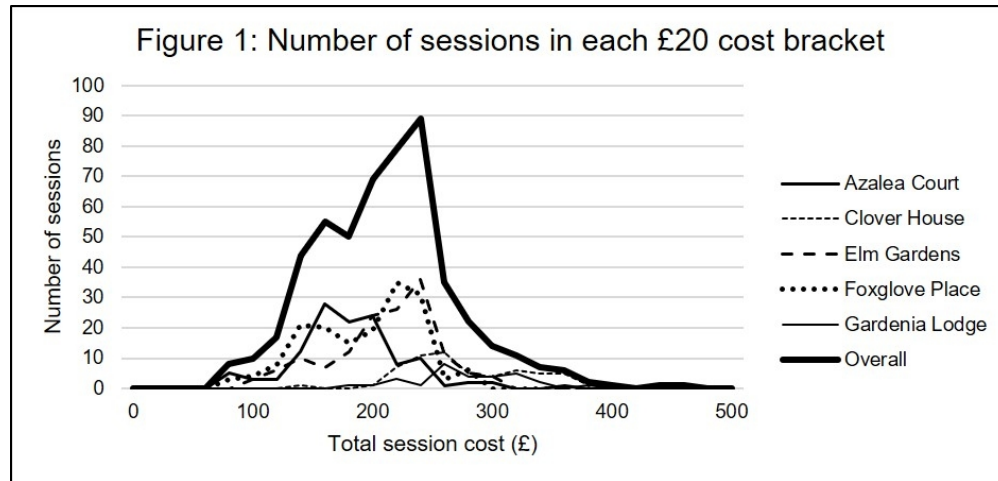


Figure 1: Number of sessions in each £20 cost bracket

159x76mm (150 x 150 DPI)